

108-TAP 1:4 INTERPOLATION FIR FILTER FOR
DIGITAL MOBILE TELECOMMUNICATION

ABSTRACT OF THE DISCLOSURE

A 108-tap 1:4 interpolation FIR filter device for digital mobile telecommunication having a single bit input is provided. The filter employs a look-up table minimum scheme and a pipeline structure in which the size of the entire look-up tables is significantly reduced by dividing four coefficient groups into three parts, respectively, and effectively using the symmetry of the 108-tap filter coefficient and the symmetry within the look-up table. Thus, the filter can simultaneously process 108-tap 1:4 interpolation FIR filter operations for a single input of four channels by means of a single filter without increase of an operating frequency. The FIR filter includes an input shift register and selector for processing a single bit input of four channels, an address generator for producing addresses of the look-up table, look-up table groups $0 \sim 3$ for producing filter outputs group by group via the look-up table and the calculator using the address as an input, a pipeline registers for delaying the filter outputs for coefficient group which are outputted in parallel, a group selector for converting the delayed outputs in serial channel by channel, and a pipeline registers for matching the time of filter output channel by channel. Therefore, the filter has advantages that it can reduce the design area of the FIR filter by using the look-up table constituting the filter and also processing filter inputs from the four channels by means of a single filter and that it can reduce the power consumption by using the same operating frequency to a general single filter.